

with the fact that the Numbat took refuge in it when disturbed, seems to point to this. It may also be of interest to note that in the short time whilst she remained captive before she was released she exhibited considerable digging skills whilst attempting to escape by digging into the soil in the corner of her cage.

An examination of the location and structure of the burrow also reveals that it is no casual digging. If the diagrams of the burrow's location and structure are examined it is evident that a considerable amount of attention has been given to the siting of the entrance and to the structure of the burrow itself. Any animal attempting to dig it out such as a dog or a fox would find it a difficult, if not impossible task. The entrance is so located as to leave the minimal amount of space for any large animal to dig. The fact that the first 30 inches of the tunnel are close up against the underside of the log would also contribute towards making it difficult to dig out.

The young would have been approximately 1 month old (Calaby, 1960). It appears that the female Numbat may dig a breeding burrow at about this time in preparation for the time when the young become too large for her to carry. The Numbat has no pouch, the young are simply attached to the teats and cling to the long fur on the underside of the mother.

The breeding-burrow, however, as a depositing place for the young fills the gap between when the young are too large for the mother to carry but still too small to accompany her on foraging expeditions.

Another almost identical empty burrow, believed to be a Numbat's, has since been discovered in a similar location. This one was liberally lined with bark from a nearby paperbark, *Melaleuca parviflora*.

REFERENCES

- CALABY, J. H., 1960. Observations on the banded ant-eater, *Myrmecobius f. fasciatus* Waterhouse (Marsupialia), with particular reference to its food habits. *Proc. Zool. Soc. Lond.*, 135 (2): 183-207.
- GLAUERT, L., 1935. Answers to correspondence. *Our Rural Magazine*, June: 147-150.
- RIDE, W. D. L., 1970. *A Guide to the Native Mammals of Australia*. Oxford Univ. Press.
- SHORTRIDGE, G. C., 1910. An account of the geographical distribution of the marsupials and monotremes of south-west Australia, having special reference to the specimens collected during the Balston Expedition of 1904-1907. *Proc. Zool. Soc. Lond.*, 1909: 803-848.
- TROUGHTON, Ellis, 1967. *Furred Animals of Australia*. Angus & Robertson.
- WHITTELL, H. M., 1954. John Gilbert's notebook on marsupials. *W. Aust. Nat.*, 4: 104-114.
- WOOD JONES, F., 1923. *The Mammals of South Australia*. Part I. Govt. Printer, Adelaide.

WATERFOWL SEEN AT LAKE CLAREMONT (BUTLER'S SWAMP) IN THE SPRINGS OF 1972 and 1974

By K. EMORY, I. R. LANTZKE*, G. L. LAMBERT and F. OSBORNE,
Graylands Teachers College, Mimosa Ave., Graylands, W.A.

In view of the continuing decrease in the quantity and quality of wetlands on the Swan Coastal Plain, summarized by Seddon (1972), and the sensitivity of birds to environmental effects, it would seem desirable to publish periodically lists of birds observed on representative lakes and swamps. In this way the interested public may be able to keep informed of the position. In late 1972, and again in spring 1974 the water birds

*Author to whom correspondence should be addressed.

TABLE 1. THE NUMBER OF ADULT WATERFOWL AND THEIR YOUNG (IN PARENTHESES) SEEN AT LAKE CLAREMONT ON THE SPECIFIED DATES.

SPECIES	Date	1972							1973							1974						
		7/4	5/9	24/10	24/11	8/12	28/12	8/1	21/9	23/9	24/9	6/10	13/10	20/10	3/11	10/11	21/9	23/9	24/9	6/10	13/10	20/10
Black Duck	18	14	12	20	7*	1	15 (6)	29 (35)	2 (1)	6 (4)	16 (24)	27 (18)	25 (15)	32 (12)	28 (15)							
Pink-eared Duck			1	1	2*		4 (3)	4 (3)	5	7	4 (2)	2	1	3	1							
Blue-billed Duck	2	4	3	2	4		7	5	7	13	39 (2)	34 (2)	36 (5)	37 (5)								
White-eyed Duck	4	2	2*	2	5	2	8	2	5	3 (5)	7	3	1	1								
Grey Teal	20	14	14	13	3	10	19	18	17	18	18	17	17	17								
Muscovy Duck							1															
Black Swan	4	6*	4 (3)		1 (3)	4	2 (4)	3 (5)		2	3 (5)	3 (5)	4 (6)	3 (5)								
Swamp Hen			5	3	1		1	1	3	6	8	5	8 (1)	8								
Dusky Moor Hen	2	2	1*	6*	2	12	4	1	3	3	3	2	4	7								
Coot				4	2		9	9	13	15	17*	14	10	17								
Little Grebe	10 (37)	4	4	6*	8 (5)	3	4	3 (1)	8	20 (1)	15 (5)	34 (7)	7	12 (6)								
Hoary Headed Grebe			2								13 (6)		21 (1)	20 (9)								
Great Crested Grebe													1									
Pelican									1													
Little Blitern								1														
Cormorants										1			2	5	7							
Silver Gull	17	35	40	35	26	5	17	8		7100	7100	750	750	750								
Reed Warbler			2						1				+	+								

NOTES: 1. * indicates a nest observed or inferred.
 † indicates calls only heard, but no birds seen.
 2. Observations were made in the mornings (before approx. 9.00 a.m.) except on 23/9/74 when the observation period was 1.30 to 3.00 p.m.
 3. The gulls appeared to use the lake mainly when the weather was rough.

on Lake Claremont were systematically observed (Osborne, 1972; Emory, 1972; Lambert, 1974) and the results are presented in Table 1.

DISCUSSION

The physical geography of Lake Claremont and its history up to 1950 have been described by Evans and Sherlock (1950), but since that time considerable filling of the lake has occurred. As a result the area of near permanent water is now reduced to approximately 50 acres. The margins are now steep man made banks around most of the lake and no longer carry native plants, being either bare or covered with introduced grass (for playing fields). The plants of the wet areas still remaining, do not appear to be as changed since 1950 as the lake's margins.

The composition of the lake's water differs from that of the neighbouring lakes, being from approximately 1½ to 3 times more saline than those of Perry Lakes (except the smaller third lake), Herdsmans swamp and Mongers Lake. Values of chloride ion concentrations (in mg/l) in these lakes are given in Table 2.

TABLE 2.—SOME CHLORIDE ION CONCENTRATIONS IN LAKE CLAREMONT AND 4 NEIGHBOURING LAKES BETWEEN 1972 AND JANUARY 1975. CONCENTRATIONS ARE IN MG/l (PARTS PER MILLION).

	1972	1973	1974		1975
	April	December	April	August	January
Lake Claremont	2,800	290	570	310	510
Perry Lakes East		200		150	260
Perry Lakes central	410	180	410	76	193
Mongers Lake		150	210		
Herdsmans Swamp*		190	110		88

*Herdsmans's swamp figures are for samples taken from a small rather stagnant drain on the north side. They may not be representative of the main water mass.

The very high concentration of chloride ion in Lake Claremont in April 1972 is consistent with the low water level noted at that time, when the northern end of the lake was little more than a series of connected puddles. There was also a heavy growth of algae on the lake's surface at that time. Growths of algae were not observed in the autumn of 1974.

In considering the bird observations it should be pointed out that, while there is no reason to doubt the correctness of all the identifications, at the commencement of their field work the observers were not experienced bird watchers. Also the accuracy of the bird numbers is not high, as counts were obtained using several positions around the lake, with significant elapsed time between countings, during which bird movement could occur.

Within these limitations it appears that despite further filling of the lake between 1972 and 1974 a larger number of water birds frequented the lake in 1974 than in 1972. This could be due to differences in the timing of the seasons in the two years, but could result from the "improved" condition of the water in autumn 1974 compared with autumn 1972. Besides the high salinity of the lake in April 1972, the rainfall record for Perth shows the winter rains to have commenced late (May: 7 wet days and 31.5 mm rainfall) compared with 1974 (May: 15 wet days and 200 mm rainfall). In 1973 and 1974 total rainfall was above average, whereas in 1971 and 1972 it was below average.

Therefore it appears that despite the filling of the lake a wide range

of waterfowl spend the late winter and the spring on Lake Claremont and that some continue to breed there, at least when the season is wet. These include the Pink-eared Duck (both years). The nesting of this species on Lake Claremont has been recorded previously (Rook, 1963).

REFERENCES

- EMORY, K., 1972. Natural Science Option Thesis. Graylands Teachers College.
- EVANS, G. A. and N. V. SHERLOCK, 1950. Butler's Swamp, Claremont, W.A. *W.A. Naturalist*, 2 (7): 152-160.
- LAMBERT, G. L., 1974. Ecology Option Thesis. Graylands Teachers College.
- OSBORNE, F., 1972. Natural Science Option Thesis. Graylands Teachers College.
- ROOK, D. A., 1963. Nesting of the Pink-eared Duck near Perth. *W.A. Naturalist*, 8 (8): 187-188.
- SEDDON, G., 1972. *Sense of Place*. University of Western Australia Press: Nedlands. Pp. 226-232.

AN ABANDONED ABORIGINAL CAMP SITE, NEAR PARABURDOO, WESTERN AUSTRALIA

By G. B. WHITFIELD*

ABSTRACT

Stone artefacts at an abandoned aboriginal camp have recently been discovered 17 km south of Paraburadoo. The camp site is in flat terrain and encircles a 6 m high chert-breccia outcrop, the summit of which overlooks the surrounding country for several kilometres. A cave exists in the rock outcrop. Artefacts found include spear points, grind-stones, a hand axe, various types of scrapers, cutting-flakes and microliths.

INTRODUCTION

The author was attracted to the vicinity of the camp site by black and white agate in a dry creek bed 17 km south of Paraburadoo.

Paraburadoo is a fairly new 'iron ore' town, situated 980 km north northeast of Perth, and there is a void in the literature about the history and culture of the early aboriginal people of this area (*i.e.* the southern portion of the Hamersley Range Province).

From the agate-bearing creek bed, the only significant topographical feature, in an otherwise flat terrain, is a 6 m high, 23 m long and 12 m wide outcrop of white chert-breccia 120 m to the west. On approaching this outcrop angular black and grey chert fragments begin to appear in the scree which is mainly white chert-breccia. Many of the black and grey chert fragments, on closer inspection, show deliberate flaking and trimming along one or more margins. At the rock outcrop black and grey chert fragments are abundant and beneath this outcrop there is a cave 4.2 m long, 2.5 m wide and 1.1 m high. The floor of the cave is covered by a deposit of fine sand about 15 cm thick, and the ceiling is smoke-stained.

GEOLOGY

The area of the camp site consists of Recent colluvium and Lower Proterozoic sediments of the Wyloo Group. The rock types present are banded quartzite and chert (these yielded the black and white agate), dolomitic limestone, chert breccia and ecalerete. No outcrops of dolerite or black and grey chert were found. This indicates that the materials

* Geology Department, Hamersley Iron Pty. Limited, Paraburadoo, Western Australia 6754.